I. The Origin of Life
   A. Hypotheses about the origin of life are different from hypotheses that organisms have evolved from a common ancestor over time

   B. According to one hypothetical scenario, there were four main stages in this process:

   C. Evidence that organic monomers can form abiotically
      1. Conditions on early Earth
      2. The Oparin and Haldane experiment
      3. The Miller-Urey Experiment
      4. Was the early Earth’s atmosphere reducing?

   D. Once organic monomers form, could they have produced organic polymers?
E. Formation of Protobionts

1. Definition of Life: replication and metabolism

2. How protobionts can form

3. The significance of protobionts

F. RNA as the first genetic material

1. Ribozymes

2. Evolution of RNA sequences

G. Natural Selection on Protobionts
II. Introduction to the History of Life

A. Radiometric dating can be used to determine the age of rocks

B. The history of life on Earth is divided into three **Eons**:

1. Archaean

2. Proterozoic

3. Phanerzoic

   i. The Phanerzoic Eon is divided into three **Eras**:

C. Mass Extinctions

1. What is a mass extinction?

2. The Permian Mass Extinction

3. The Cretaceous Extinction
III. The Major Lineages of Life

A. Early Prokaryotes and Metabolism

B. The First Eukaryotes

C. Multicellular Eukaryotes

D. The Cambrian Explosion

E. The Colonization of Land

F. Continental Drift
IV. The Tree of Life

A. Linnaeus and the Two-kingdom system

B. Whittaker and the five-kingdom system

1. Kingdom Monera

2. Kingdom Fungi

3. Kingdom Plantae

4. Kingdom Animalia

5. Kingdom Protista
C. Carl Woese and the Three Domain System

1. Basis for the three domain system

2. The Three Domains:

   i. Domain Eubacteria (or Bacteria)

   ii. Domain Archaea

   iii. Domain Eukarya